WE have received a further supply of University Calendars. That of University College, Liverpool, is pleasant reading in some parts; the list of donations and subscriptions to the young college is quite worthy of Liverpool, and might well excite the envy of more struggling institutions. Here we have 10,000*l.* for a Chair of Natural History, another 10,000*l.* for a Chair of Chemistry, and the like sums or nearly so, for Chairs of Philosophy, of Art, of Mathematics, for a chemical laboratory, and so on, besides thousand on thousand for other purposes. Liverpool College has had a good start, and much will be expected of her. The Calendar of Firth College, Sheffield, is small and business-like, and in the statement of the objects of the college, the governors show that they have a satisfactory idea of what such an institution should be and do. We have also the Calendar of University College, Wales, in whose curriculum science has a place.

TWO interesting cases of explosion are described by Herr Pfaundler in a recent number of Wiedemann's *Annalen*. A closed glass tube two-thirds filled with liquid carbonic acid was inserted a few centimetres deep in a bath of carbonic acid and ether brought to a temperature of – 100° C., in order to get crystallised carbonic acid. Beautiful crystals were soon formed in the immersed part of the tube, and a layer of the liquid acid remained above. The tube was then raised by its upper part into the air, and in a few minutes it exploded violently. This tube had often before borne a rise of temperature to 31°. The explosion is attributed to thermal expansion of the solid carbonic acid (as a more likely cause, than vapour-pressure on glass rendered brittle by a low temperature). In the second case, a large sheet zinc bell-gasometer, used exclusively for keeping oxygen gas, was concerned. It had stood about six months unused, containing a little of the gas. When the issuing gas was being tested with a glowing match, an explosion occurred, shattering the apparatus. Any entrance of hydrogen or coal-gas is out of the question. It is supposed that the water had gradually absorbed acid vapours from the air of the laboratory, and that the zinc had been thus attacked, yielding hydrogen. The zinc was in fact somewhat corroded. It is recommended that the zinc in such cases be coated with a lac.

IN a recent communication to the *Rivista Scientifico-Industriale*, Prof. Palmieri concludes from experiments (1) that glycerine in contact with an ammoniacal nitrate of silver solution partially reduces the metal in the cold state, and with heat the reduction is more pronounced, and gives the appearance of a metallic mirror; (2) that with addition of a solution of caustic potash, either in the cold or hot state, complete reduction is produced, with a most brilliant metallic mirror; (3) that some substances accelerate the reduction, such as alcohol and ether; and (4) that, operating in the cold state and in darkness, the reduction is more brilliant and rapid that when operating in light. On the whole it appears that the reducing action referred to may be applied industrially with advantage to the silvering of mirrors, both on account of the facility of the process and its economy. The exact proportion of the components is important, and Prof. Palmieri promises particulars shortly.

A SIMPLE anemoscope and anemometer, designed by the Brothers Brassart of Rome, at the instance of Prof. Tacchini, especially for use in meteorological stations of small resource, is described in the *Riv. Sci. Ind.* (Nos 12-13). The chief peculiarity in both instruments is the system of free transmission, obviating prejudice to the indications from changes of temperature; the axis has several universal joints in its course, and in the case of the anemoscope passes down freely through a central hole in the plate bearing the compass card, a weight being hung at the end of it. It carries an index just over the card. In the anemometer the weighted axis has a perpetual screw acting on a toothed wheel, which, by means of a system of jointed rods, actuates three discs having peripheral numbers, in such a way as to present a numerical record of the wind's velocity in a given time. About forty of these anemoscopes and anemometers are now at work at various Italian stations.

EXPERIMENTS have been recently made in Rome by Signors Capranica and Colasanti regarding the action of oxygenated water on the system. Physiologically absorbed (according to Hueter's method) the substance acts as a poison, quickly killing animals, the fatal dose varying with the animal's size (about 25 cc., is enough for a dog weighing 3 kgms., 75 cc. for one weighing 13 kgms.). The poisonous action appears in all the great functions of the body, especially that of the spinal cord; the excito-motor power of that organ is over-excited, as shown by convulsive phenomena (tetanus, locomotor ataxy, &c.). The physico-chemical acts of nutrition are also profoundly disturbed, as is proved by the very pronounced glycosuria previous to death. All these disturbances are attributable to decomposition of the H_2O_2 in contact with the tissues. The consecutive phenomena in poison with oxygenated water are identical (the authors say) with those M. Bert has observed as resulting from the action of compressed oxygen.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius* ♀) from South Africa, presented by Mr. H. Banfield; a Moustache Monkey (*Cercopithecus cephus*) from West Africa, presented by Mrs. Heath; two Macaque Monkeys (*Macacus cynomolgus* ♂ ♀) from India, presented by Mr. F. J. Newton; a Great Anteater (*Myrmecophaga jubata* ♀) from Parana, presented by Sir William Wiseman, R.N.; a Vulpine Phalanger (*Phalangista vulpina* ♂) from Australia, presented by Mr. W. Marston Clark; three Gold Pheasants (*Thaumalea picta* ♂ ♂ ♀), six Bamboo Partridges (*Bambusicola thoracia*), a Common Moorhen (*Gallinula chloropus*) from China, a Black Kite (*Milvus migrams*), captured in the Red Sea, presented by Mr. Theodore A. W. Hance; a Horned Lizard (*Phrynosoma cornutum*) from Texas, presented by Mr. W. Pilcher; a Squirrel Monkey (*Chrysothrix sciurea* ♂) from Brazil, a Ring-tailed Coati (*Nasua rufa*) from South America, deposited; a tiger (*Felis tigris* ♂) from India, two White-eared Conures (*Conurus leucotis*) from Brazil, two Dusky Parrots (*Pionus violaceus*) from Venezuela, a Horned Parrakeet (*Nymphicus cornutus* ♀) from New Caledonia, received in exchange; a Wapiti Deer (*Cervus canadensis* ♀), a Geoffroy's Dove (*Peristera geoffroii* ♀), bred in the Gardens.

OUR ASTRONOMICAL COLUMN

COMETARY DISCOVERIES.—By telegram to the Earl of Crawford's Observatory at Dunecht, M. Cruls, director of the Observatory at Rio Janeiro, announces the presence of a bright comet in the morning sky, the position of which on September 11·718 M.T. at Rio, was in R.A. 9h. 48m., Decl. – 2° 1′; it was visible to the naked eye.

On Sunday last, Mr. A. Ainslie Common, of Ealing, while observing the sun with a special telescope (reflector with glass reflecting-surfaces only), found a fine comet near the sun: nucleus bright, tail about 4′ long, and apparently much brighter at each side, giving the appearance of two tails. Mr. Common compared it for position with the sun's limbs, and from his observations we find for the comet's place at Greenwich noon, on September 17, R.A. 11h. 33m. 58·3s., Decl. + 1° 42′ 16″; the hourly motion in R.A. appeared to be + 1m. 14s., and in Decl. + 4′·5.

M. Cruls thought his comet might be the expected one of 1812, but this is certainly an oversight. Were the comet of 1812 in his observed right ascension on September 12, its declination would be much further north than that observed if the comet were approaching perihelion, and much further south if it were receding therefrom. Whether the comet detected at Rio is identical with the remarkable one discovered by Mr.

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Common, it would be premature to decide upon present data. The Brazilian Telegraph Company has cabled from Madeira two positions for September 12 and 13, obtained on H.M.S. *Triumph* by Capt. Markham, but taken in conjunction with the Rio message, they tend to throw a doubt upon the accuracy of some of the figures so far received.

Another comet discovered by Mr. Barnard is announced in a telegram from Boston, U.S., to Dunecht, it is described as circular, 2′ in diameter, with some central condensation. An observation at Harvard College gives the following position:—

Sept. 14·8162 G.M.T.: R.A. 7h. 19m. 17·8s, Decl. + 16° 3′ 51″.
Daily motion in R.A.: + 1m. 44s.; in Decl.: + 43′.

There is no possibility of identity of this comet with that of 1812.

THE TOTAL SOLAR ECLIPSES OF 1883 AND 1885.—Observers of the total solar eclipse on May 6, 1883, will have but very limited observing-room, and in fact will be confined for stations to one or two of the smaller islands or islets of the Marquesan group, the Roberts Islands of the Admiralty Chart. Wide separation of the parties to secure better chances of favourable weather will therefore be impracticable. The same contingency will occur in the case of the total eclipse next following, viz. that of September 8, 1885, where the course of the central zone is again almost wholly a sea-track. In this case observers will be limited to the southern parts of the north island of New Zealand, and to the extreme northern point of the southern island.

The following figures will indicate the precise conditions:—

Long. E.		Latitude, N. limit of totality.		Latitude, Central Eclipse.		Latitude, S. limit of totality.
°		°		°		°
171	...	− 39 31·4	...	− 40 20·2	...	− 41 10·2
173	...	39 42·0	...	40 31·0	...	41 21·0
175	...	39 55·0	...	40 43·8	...	41 34·4
177	...	− 40 9·5	...	− 40 58·8	...	− 41 49·2

The duration of totality on the central line in longitude 175° will be 1m. 52s.

GEOGRAPHICAL NOTES

AT the Southampton meeting of the British Association Mr. Joseph Thomson read a paper *On the Geographical Evolution of the Tanganyika Basin*. The keynote of this paper is struck by a reference to a recent lecture of Dr. Archibald Geikie. to the Royal Geographical Society, in which he points out that the days are now over in which the scientific geographer is content with the simple description of the superficial aspects of the various regions of the globe. He must also know how they came to be, and what they have been in the past. This line of inquiry is applied by Mr. Thomson to the lake regions of Central Africa, but more particularly to the Tanganyika Basin. In the first place he presented a bird's-eye view of the lake regions from the Indian to the Atlantic Ocean, bringing into relief only the most prominent features of the geography, but describing more in detail the aspect of the Tanganyika Basin, round which the chief interest centres. From a description of these purely superficial matters he proceeded to describe what these have been in the remote past, and the manner in which they have been evolved, being of course compelled to call in the assistance of the sister science geology. The conclusions he arrived at as to the primary origin of the region are, from purely hypothetical considerations, based on the theory of a shrinking nucleus, and the necessary effects on the earth's crust arising therefrom. At a later stage, however, he is on safer grounds when he is able to appeal to the rocks themselves as to the aboriginal conditions of the African continent south of the Equator. These, according to Dr. Thomson, prove the existence of an immense central sea cut off from the ocean by the elevation of the continent, and which was almost coterminous with the present drainage area of the Congo. An elevated ridge was upheaved along the eastern boundary of this sea, the origin of the trough of Tanganyika, by the collapse of the centre of this ridge and the central sea, subsequently drained away to the west, leaving Tanganyika isolated. Mr. Thomson then proceeded to describe how its secondary characters arose, and its scenery was moulded, by the action of sub-aërial denudation on rocks of different powers of resisting the decomposing and eroding agents, and explained the curious marine-like type of its shells, the origin of its outlet, the Lukuga, the freshening of the water of the lake, and finally the curious intermittency of the outflow. The various stages in the evolution of the Tanganyika Basin were summarised as follows:—The first appearance of the future continent, we have been led to believe from various theoretical considerations, was the appearance of a fold of the earth's crust bounded by two lines of weakness converging towards the south, which fold gradually rose till it appeared above the ocean, first along these two lines of weakness, in the form of a series of islands, which finally join, inclosing in their centre a large part of the ocean. This inclosed water area formed a great central sea, and the inclosing land along the lines of weakness is now indicated by the east and west coast ranges. In the second stage the continent of Africa south of 5° N. lat. presented the outline of the continent of to-day. The third stage shows the central plateau with the great central sea very much diminished in size, and almost coinciding with the present Congo Basin. There is as yet no evidence of the existence of Tanganyika. After an enormous period of undisturbed deposition of sand in the sea, the fourth stage is ushered in by a period of great continental covulsions. On the line of the future Tanganyika a huge boss of rock is intruded into the throbbing crust, and the surrounding region elevated to a considerable extent, followed by the subsequent collapse of the body of the elevated area originating the great abyss of Tanganyika. The fifth great stage is marked by the formation of a channel through the western coast mountain, causing the draining of the great central sea, which immediately becomes the inner drainage area of the Congo. The sixth stage then sees Tanganyika isolated as a lake by itself, from which time dates the moulding of its present scenery, the formation of an outlet, the freshening of its waters, and the lowering of its level, and finally we have seen that the intermittency of the lake's outflow is explained by the probable fact that the rainfall and evaporation nearly balance each other in ordinary seasons.

THE Geneva correspondent of the *Times* sends some notes on an interesting paper recently read by Prof. Calladon:—"So far back as 1880 M. de Saussure suggested the probability of the level of Lake Leman being much lower than it had been a few centuries previously, and that there had been a time when the upper part of Geneva formed a peninsula, washed on every side except that of Champel, by the waters of the lake. This theory has lately been confirmed by the observations of Prof. Calladon, who, at the recent meeting of the Association of Swiss Geographical Societies, read a paper on the subject that attracted much attention. It results from the Professor's investigations that the Plateau of the Tranchée, to the south-east of the city, and the hill once crowned by the temple of Diana, and now by the cathedral, are parts of the same lacustrine terrace, both being composed of regular beds of sand and gravel, having an inclination of 30 to 37 degrees, and dipping in a north-westerly direction. Superimposed on these beds is a horizontal layer of pebbles of an average thickness, much exceeding the thickness of the oblique layers underneath. The height of this layer, Prof. Calladon contends, corresponds with the former *maximum* level of the lake, which was 28 to 30 metres higher than the present level. The excavations for the foundation of the new theatre which were laid in 'drift,' had to be carried to a great depth, and included 3000 square metres of ground. It was quite evident from the nature of the deposits, which had not been previously disturbed, that hereabouts the Arve, once upon a time, joined the Rhone, and other excavations have indicated the old course of the former river to the point at which it now takes its departure. Underneath the inclined bed of pebbles and gravel comes glacial clay, identical in every respect with the glacial clay that now underlays the bed of the Rhone. It is from the depth of drift resting upon this platform of gravel clay that Prof. Calladon calculates his estimate of the lowering of the level of Lake Leman in modern times. He is confirmed in his conclusion by the fact that the deposits in the ancient bed of the Arve are not alone similar in kind to the deposits still brought down by the river, but identical with them in chemical composition. In the opinion of Prof. Calladon, Geneva, at a period not many centuries before the Christian era, occupied a strategic position analogous to that of many other cities of antiquity in being built upon a promontory almost surrounded by water. The uncovering of the platform of glacial clay enables Prof. Calladon further to ascertain the minimum level of the lake at the time when the superincumbent layers of Alpine sand and gravel were brought down by the Arve. It follows, from the geometric measurements which have been

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